REMARKS

Claims 1-29 are all the claims pending in the application. Claims 17-29 are added to further define the invention as discussed in detail below.

Drawings

The Examiner has not indicated approval of, or objection to, the Formal Drawings filed on March 8, 2002. Applicants respectfully request the Examiner to indicate whether the drawings are approved.

Claims

Claims 1-9 and 12-16 are rejected under 35 U.S.C. § 102(b) as being anticipated by Ryozo Sato (JP 03171616).

Claims 1-9 and 12-16 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Applicants' Admitted Prior Art in view of Yasuki Nakao (JP 03069119) and Ryozo Sato (JP 03171616).

Claim 10 is rejected under 35 U.S.C. § 103(a) as being unpatentable over Applicants' Admitted Prior Art in view of Yasuki Nakao (JP 03069119) and Ryozo Sato (JP 03171616), and further in view of Wollam (3,783,822).

Claim 11 is rejected under 35 U.S.C. § 103(a) as being unpatentable over Applicants' Admitted Prior Art in view of Yasuki Nakao (JP 03069119) and Ryozo Sato (JP 03171616), and further in view of Schmidt (5,343,938).

Analysis

Of the rejected claims, claim 1 is the only claim in independent form; therefore, the following discussion is initially directed to this independent claim.

The present invention provides a film-forming device wherein the central rotation shaft SC for rotating the susceptor 300 is removed from the conventional rotation/revolution mechanism (see FIG. 5 of the specification), so that a desired temperature profile is readily made on the susceptor. The present invention also provides a film-forming device wherein substrate trays 20 are rotated synchronously with the rotation of the susceptor without requiring a complicated mechanism for rotating the substrate trays.

In this film-forming device, a rotating (revolution) force is inputted at the outer periphery of the susceptor 30 and through the rotation generating section (e.g., stationary gear 4) the substrate trays 20 are rotated synchronously with the rotation of the susceptor 30.

Claim 1 has been amended to clarify the structural position at which the rotating forces are imparted to the susceptor and substrate trays.

Claim 1 is rejected as being anticipated by JP '616. Each substrate is revolved and rotated, however, only the revolving of the susceptor is described and there is no discussion related to the rotating of the individual substrates. More specifically, JP'616 discloses an intermetallic compound semiconductor manufacturing device. In this manufacturing device, only rotating the susceptor can provide a uniform thin-film similar to that made by the rotation/revolution of wafers. This manufacturing device is of a facedown type MOCDV device wherein a plurality of wafers W are arranged circumferentially around the center axis of the susceptor 30 and revolved by the rotation of the susceptor 30. Meanwhile, the gas supply port 40

is positioned offset from the center of revolution. See the offset amounts Ex and Ey of FIG. 2. Therefore, the relative position between each wafer W and the gas supply port 40 varies with the rotation of the susceptor 30. As the result, each wafer W passes through areas with different film growth speed during the revolution of the wafers W, resulting in improved film-growth uniformity for each wafer W. The manufacturing device does not include a rotation generating section.

FIG. 6 of JP'616 illustrates that the conventionally known device (FIG. 5) rotates and revolves wafers. However, the JP '616 manufacturing device does not rotate and revolve wafers.

As a result, Ryozo Sato (JP'616) does not disclose the second rotating mechanism recited in claim 1, and each of its features, including the rotation generating section that rotates the substrate trays by imparting a rotating force to each rotation input section of the substrate trays.

Claim 1 is also rejected as being obvious over the combination of the admitted prior art, JP '119, JP '616 and Schmidt.

The admitted prior art discloses a rotation/revolution mechanism including a rotation mechanism (not shown) for rotating substrates W and a rotation shaft for rotating the susceptor 300. There is no suggestion of the particular structure of the mechanisms of the present invention wherein the revolution generating section and the rotation generating section rotate the susceptor and substrate trays at their outer peripheries. Instead, the admitted prior art utilizes a central rotating shaft.

JP '119 discloses revolution and rotating mechanisms, each rotated by their own shaft.

As mentioned above JP '616 discloses a rotating and revolving feature, but fails to disclose a separate rotating mechanism; it merely discloses gears for revolving the susceptor at its outer periphery but does not disclose a mechanism for imparting a rotating force to the outer periphery of the substrate trays. Further a shaft for inserting a thermocouple is provided at the center of the heating means 50.

In view of the foregoing, the combination of references would not have led one of ordinary skill in the art to provide a second rotating mechanism in which the rotation generating section rotates the substrate trays by imparting a rotating force to each rotation input section provided at the outer periphery of the substrate trays.

First, JP '119 does not disclose a rotating or revolving mechanism which imparts a force on a revolution input section or a rotation input section on an outer periphery of a susceptor or substrate tray. Rather this reference merely discloses the use of rotating central shafts. Specifically, this reference discloses that the stages 2 are rotated by their central shafts. As shown in Figs. 1 and 2, the outer periphery of the gears 4 are rotated which thereby impart a rotating force on the central shaft of each stage 2. There is no rotation input section on the outer periphery of each stage 2 and no rotation generating section that imparts a rotating force to such a rotation input section on an outer periphery of the stage.

JP '616 does not disclose a rotating mechanism according to the present invention either. This reference merely discloses a revolving mechanism for imparting a force to the outer periphery of a susceptor, but does not teach or suggest a mechanism for imparting a force to the outer periphery of the substrate trays as discussed above in the anticipation rejection.

Thus, even if one were to combine the references, one would not have been motivated to provide two rotating mechanisms, each of which has a structure for imparting a rotating force to the outer periphery of a susceptor and a substrate tray, respectively.

Further, since each of the references discloses a structure including a center shaft, there is no recognition of drawbacks of temperature controllability due to the provision of the center shaft. Therefore, even if one were to combine these references, it is impossible to achieve the advantageous effect of the present invention in that "a desired temperature profile is readily made on the susceptor by removing the center shaft".

In view of the foregoing, claim 1 is patentable.

The remaining rejections are directed to the dependent claims. These claims are patentable for at least the same reasons as claim 1, by virtue of their dependency therefrom.

The newly added independent claim (claim 19) is patentable for similar reasons to claim 1 above. Moreover, claim 19 further recites that a temperature control mechanism positioned in a reacting chamber extends across the rotation axis of the susceptor and surrounds the substrate tray retaining sections.

With this construction of the film-forming device, since the reacting chamber extends across the rotation axis of the susceptor and surrounds the substrate tray retaining sections, it is possible to eliminate the difficulty in controlling the temperature profile within the reacting chamber due to the central shaft extending from the center part of the susceptor.

Therefore, claim 19 is patentable.

Newly added claims 17 and 18 clarify that the substrate trays rotate synchronously with the rotation of the susceptor, and the structure of the gears. These claims are patentable for at least the same reasons as claim 1.

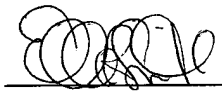
The other newly added claims (20-29) are patentable at least by virtue of their dependency from claims 1 and 19.

Conclusion

In view of the above, reconsideration and allowance of this application are now believed to be in order, and such actions are hereby solicited. If any points remain in issue which the Examiner feels may be best resolved through a personal or telephone interview, the Examiner is kindly requested to contact the undersigned at the telephone number listed below.

The USPTO is directed and authorized to charge all required fees, except for the Issue Fee and the Publication Fee, to Deposit Account No. 19-4880. Please also credit any overpayments to said Deposit Account.

Respectfully submitted,



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